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ABSTRACT

After a review of relevant literature on socioeconomic status (SES) and the ways in which is used for higher education institutional research and policy, a detailed data analysis of Victoria University (VU), Australia student data was undertaken. Between 10,000 and 15,000 domestic student addresses were "geocoded" to Australian Bureau of Statistics collection district level. A survey of individual students reenrolling in 2001 that included Western Department of Employment, Training, and Youth Affairs (DETYA), Australia parental occupation and education data (n=approximately 1,000) was also analyzed. The most important findings were: (1) the debate for practical reasons tends to focus on area versus individual measures, but SES is a richer and more complex subject and must be acknowledged as such; (2) it is apparent that VU's student catchment is on average of lower SES than the Melbourne average, using various area measures of SES, including the DETYA-Martin indicators; (3) there is only a very small difference between average area SES measures at the collection district and the postcode (postal area code) level. In practical terms this means that the postcode method is adequate, as well as being cheaper and more efficiently obtained, for analyses at an aggregated (or average) level; and (4) individual surveys of students do not prima facie add to the quality of aggregated institution level SES results delivered by area analyses. This again suggests that the postcode method is best for practical reasons. (Contains 1 chart, 10 tables, and 55 references.) (Author/SLD)

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Equity indicators: Measures of socio-economic status at Victoria University

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ABSTRACT

After reviewing relevant literature on socio-economic status (SES) and the ways in which it is used for higher education institutional research and policy, a detailed data analysis of Victoria University (Australia) student data was undertaken. Between 10,000 and 15,000 domestic student addresses were 'geocoded' to Australian Bureau of Statistics (ABS) collection district level. A survey of individual re-enrolling 2001 students that included Western-DETYA (Department of Employment, Training & Youth Affairs, Australia) parental occupation and education data was analysed also. The most important findings were: (1) The debate for practical reasons tends to focus on area versus individual measures, but SES is a richer and more complex subject and must be acknowledged as such. (2) It is apparent that VU's student catchment is on average of lower SES than the Melbourne average, using various area measures of SES, including the DETYA-Martin indicators. (3) There is only a very small difference between average area SES measures at the collection district and the postcode level. In practical terms this means that the postcode method is adequate, as well as being cheaper and more efficiently obtained, for analyses at an aggregated (or average) level. (4) Individual surveys of students do not prima facie add to the quality of aggregated institution level SES results delivered by area analyses. This again suggests that the postcode method is best for practical reasons.

[1] Workplace Studies Centre Victoria University. The authors wish to thank Dr Stuart Svensen for his assistance. The usual caveat applies.

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ABSTRACT

After reviewing relevant literature on socio-economic status (SES) and the ways in which it is used for higher education institutional research and policy, a detailed data analysis of Victoria University (Australia) student data was undertaken. Between 10,000 and 15,000 domestic student addresses were 'geocoded' to Australian Bureau of Statistics (ABS) collection district level. A survey of individual re-enrolling 2001 students that included Western-DETYA (Department of Employment, Training & Youth Affairs, Australia) parental occupation and education data was analysed also. The most important findings were: (1) The debate for practical reasons tends to focus on area versus individual measures, but SES is a richer and more complex subject and must be acknowledged as such. (2) It is apparent that VU's student catchment is on average of lower SES than the Melbourne average, using various area measures of SES, including the DETYA-Martin indicators. (3) There is only a very small difference between average area SES measures at the collection district and the postcode level. In practical terms this means that the postcode method is adequate, as well as being cheaper and more efficiently obtained, for analyses at an aggregated (or average) level. (4) Individual surveys of students do not prima facie add to the quality of aggregated institution level SES results delivered by area analyses. This again suggests that the postcode method is best for practical reasons.

Background

The term 'socio-economic status' (SES) generally refers to a person's overall social position, and it is most commonly defined in terms of educational, occupational and economic attainments. SES can be conceptualised narrowly (e.g. education, occupation, income) or extended to encapsulate a range of factors thought to comprise and or consolidate it (e.g. ethnicity, cultural background, gender, family structure, geographical location).[2]

The most widespread approach used by Australian higher education institutions is the 'postcode method' described in *Equity and General Performance Indicators in Higher Education* (Martin 1994). All Australian universities currently use this approach as part of the accountability arrangements for the Higher Education Equity Program (HEEP). The 'postcode method' identifies the SES of students by linking the postcode of their home address to the Socio Economic Indexes For Areas (SEIFA) Index of Education and Occupation. This method has attracted criticism, primarily for assigning to individuals the 'average' SES of a postcode area. Individual students may not be representative of postcode averages.

In 1998, the Commonwealth Department of Education, Training and Youth Affairs (DETYA) commissioned Emeritus Professor John Western to review the 'postcode method'. He recommended that a more reliable measure of SES could be obtained by collecting information about the education attainment and occupations of parents directly from students (Western, McMillan & Durrington 1998). In the enrolment period in 2000-01 many universities participated in a trial of this method.

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[2] Even more sophisticated definitions are possible, such as those related to Sen's concepts of 'capability' (see e.g. Sen 1992; OECD 2001). We note these but focus in this paper on the definitions commonly used in Australia.

A third method has recently been implemented by DETYA in a radical alteration of the funding arrangements for independent secondary schools. The SES Index for General Recurrent Grants (IGRG) replaced the Economic Resources Index (ERI), which was previously used to allocate funding. The latter is similar to the 'postcode method', but it is based on far smaller geographic areas, Census Collection Districts (CDs). The IGRG applied to the CDs is a composite of Australian Bureau of Statistics (ABS) data made up primarily of education and occupation variables.

The 'postcode method' used in higher education and the 'CD method' used in allocating non-government secondary school funding are commonly referred to as area based or aggregate analyses. The third method, which we will refer to as the 'Western method', can be categorised as an individual analysis. That is, it is based on data obtained from individuals.

Debate rages about the accuracy and efficiency of SES measurement methods. According to the National Board of Employment, Education and Training, SES 'remains one of the more contentious aspects of the definitional and indicator work currently being trialled in the sector' (NBEET 1996, p. 63). SES measurement was also the focus of debate about the changes to the funding arrangements of non-government schools that attracted extensive national media coverage in late 2000 and more recently (e.g. Ketchell 2001; Dodson & Satau 2000; Marino 2000).

In mid 2000, the Equity and Social Justice Unit at Victoria University funded the Workplace Studies Centre[3] to undertake the *Equity Indicators: Measures of Socio-economic Status at Victoria University Project*. The project aimed to help improve the University's understanding of access, success, retention and participation of students from low SES backgrounds. Its key objectives included researching appropriate and measurable definitions of SES, focussing on the SEIFA indexes (Relative Socio-Economic Disadvantage and Education and Occupation) and to measure the SES of Victoria University students using the above definition(s). To explore some of the emerging issues the project team also incorporated several more specific objectives, including: to trial the SES Index for General Recurrent Grants; to trial the SEIFA Index of Economic Resources, as recommended by McIntyre (2000) for the Vocational Education and Training (VET) sector; and to survey students and participate in the national SES student survey developed by DETYA ('Western method').

Socio-economic status and inequality

> Almost one in every seven Australians live in income poverty today (2.4 million Australians or 13.3%). An estimated 732,000 (14.9%) of dependent children live in poverty in Australia. Over 1.7 million (12.8%) of adults live in poverty. (Harding & Szukalska 2000, p. 11)

Australia has never been the egalitarian workers' paradise sometimes portrayed in popular mythology, and inequality has risen in both absolute and comparative terms in recent decades (Bradbury & Markus 1999, p. 32; Parham et al. 2000, p. 29; Saunders 2001, p. 323; Harding & Szukalska 2000, p. 11). Australia had the

[3] The Workplace Studies Centre Victoria University is a research centre within the Faculty of Business and Law.

sixth most unequal income distribution of 21 Western countries surveyed in the Luxembourg Income Study (LIS 2001), and there is evidence that inequality is continuing to increase (Wiseman 1998, p. 5; Kirby 2000, p. 32; Lawrence 2000, p. 2). Higher education resources, especially those of universities, are consumed disproportionately by social elites (Teese 2000, p. 213-215; Marginson 1997, p. 194). SES is not only a powerful predictor of who participates in higher education, but it governs the type of institution students will attend, what will be studied and at what level (Skuja 1995; Marginson 1997, p. 194; DETYA 1999, p. 18).

Low SES students have low levels of higher education participation and are under represented in almost all areas and levels of study (Watson et al. 2000, p. 4; DETYA 2001; Andrews 1999, p. 12; DETYA 1999, p. 18; Western 1998; p. 11; NBEET 1996 p. 63). According to Watson et al. (2000, p. 31), the year 12 completion rate for low SES students was 75 per cent of the rate of high SES students, whereas the participation of low SES students in higher education was 42 per cent of that of high SES students. An earlier study also found that 17-24 year old students from areas comprising the lowest SES population quartile participate in higher education at approximately 60 per cent of their proportionate share, suggesting that 'there has been little improvement in the social composition of students over the past several decades' (Andrews 1999, p. 12).

A recent study commissioned by the Australian Council for Educational Research (ACER) noted a decline in the effect of SES on participation in higher education (Marks et al. 2000). The report has attracted criticism. In particular, the study used a simplistic measure of participation that failed to take sufficiently into account the 'massification' of the tertiary education system or the types of higher education accessed (Wheelahan 2001; see also response, Marks 2001).

Students from lower SES backgrounds are over represented in Agriculture, Education, Engineering and Nursing and under represented in areas usually considered more prestigious and better remunerated, such as Law, Architecture, Dentistry and Medicine. They are also significantly under represented in higher degree studies. In addition, under representation is particularly acute for certain groups, such as indigenous persons (Commonwealth of Australia 1998, p. 136; DETYA 1999, p. 18; Watson et al. 2000, p. 22). As Marginson concluded:

> [Higher education] is a highly differentiated system, in which some forms of participation were more powerful and more desirable than others. This vertical hierarchy of participation was hidden by the official policies, in which the objective was participation as an end in itself, and all forms of participation were treated as equivalent, mitigating the sharp effects of inequality with a normative 'parity of esteem', although no one believed that all institutions had equivalent status. But it was easier for governments to increase total participation than redistribute participation on a socially representative basis, or render the different forms of participation more equal to each other'. (Marginson 1997, p. 194)

The *Equity indicators project* at Victoria University

Victoria University is located in the western region of Melbourne. The region has lower levels of participation in higher education, higher unemployment and greater educational disadvantage than does Melbourne as a whole. Thirty per cent of the region's population left school aged 15 or younger, and fewer than 20 per cent of residents have a post-compulsory education qualification (Michael and Glanville 1996, p.11). Victoria University is the only provider of higher education

in the region. About one-third of its students are from a low SES background,[4] three times the national average. The access and participation of defined equity groups at Victoria University are well above sector levels.

Thirty-three per cent of residents in the western region were born overseas, more than 80 per cent of whom were from non-English speaking backgrounds (NESB). In the City of Maribyrnong, where the main University campus is located, 34 per cent of residents speak a language other than English at home, and up to one-third of the residents born overseas report that they speak English poorly or not at all (Michael & Glanville 1996, p. 18).

The *Equity indicators project* featured two key research components: first 'area analyses' of all currently enrolled students' SES (i.e. 'postcode method', 'CD method'); and second 'individual analyses' of approximately 1,700 re-enrolling students (primarily testing the 'Western method'). Although the project also included extensive consultation with University stakeholders and significant background research, this paper will focus on the main findings from data collection and analyses. The analyses are summarised in Table 1.

Table 1 Summary of analyses

Indicator	*Geographic Level*[5]	
	CD	*POA*
Index of Relative Socio-Economic Disadvantage (SEIFA)	✓	✓
Index of Education and Occupation (SEIFA)	✓	✓
Index of Economic Resources (SEIFA)	✓	✓
SES Index for General Recurrent Grants	✓	✓
Individual student surveys		✓

Area analyses

The project team trialled area analyses for two main reasons. First, area analysis is currently used by DETYA to define SES, and concerns have been raised about its validity. Second, public debate about independent secondary school funding using an area measurement of SES at a CD level has focussed attention on this method. Area based analyses provide proxy measures of student SES. They use data obtained from all residents to estimate the characteristics of an individual in the designated area. Area measures assume that people living in an area share similar occupational, educational and income attainments.

SES area analyses generally employ geographic boundaries developed by the ABS or, in the case of postcodes, by Australia Post. The CD is the smallest spatial unit and the foundation of the Australian Standard Geographical Classification (ASGC) system. It contains an average of 220 households in urban areas. Postcode areas (POAs) do not exactly concord with other ASCG areas. Postcodes are nonetheless often used to undertake area analysis, either (a) by aggregating whole CDs that fall within the physical boundaries of a postcode on a 'best fit' basis or (b) by simply using postcodes from addresses. For example,

[4] See also table 6 below.

[5] The final project report will also include analyses at a Local Government Area (LGA) level and Statistical Local Area (SLA) level for the four key area indexes.

postcode boundaries are used by the Department of Family and Community Services to collect and analyse welfare payment-statistics and by DETYA to analyse the SES of higher education students.

Some studies have noted that differences in SES measures between CDs and POAs are smaller than might be expected. Any gains in precision derived from using CD level data were considered by some researchers to be outweighed by the additional difficulties, costs and time requirements (Jones 1993; Ainley & Long 1995; Martin 1994). In 1994, Martin recommended using postcode areas to identify the SES of higher education students, and this was subsequently adopted by DETYA. Some reported benefits of the 'postcode method' are that it is simple, cost effective, not open to institutional reporting bias and does not rely on intrusive questions on social background (Ainley & Long 1995, p. 33). However, it is acknowledged as less reliable for rural than for urban areas (Martin 1994, p. 15).

Three of the four area measures of SES employed in this study are components of the ABS Socio-economic Indexes for Areas (SEIFA). The SEIFA comprises five indexes derived from variables included in the 1996 Census of Population and Housing. All SEIFA indexes are scored so that relatively advantaged areas have high index values and are standardised to provide a mean of 1000 and a standard deviation of 100 across all CDs in Australia (Australian Bureau of Statistics 1998). The five SEIFA indexes are:

- Urban Index of Relative Socio-Economic Advantage
- Rural Index of Relative Socio-Economic Advantage
- Index of Relative Socio-Economic Disadvantage
- Index of Economic Resources
- Index of Education and Occupation

The first three are general socio-economic indexes. They comprise both economic and social variables including income, education and occupation (Australian Bureau of Statistics 1998, p. 2). The present study uses only the third and most general of these measures. The Index of Relative Socio-Economic Disadvantage includes measures of income, education, occupation and employment, housing status and English fluency. There are three dummy variables relating to education in this index –persons aged over 15 who had no qualifications, had left school younger than age 15 and did not go to school. Occupation is incorporated as dummy variables and scaled according to Australian Standard Classification of Occupations (ASCO). Occupations are assigned differential weights, with 'Professionals' receiving the highest positive weighting and 'Labourers and related workers' the highest negative weighting.

The second index tested, the Index of Education and Occupation, reflects the educational and occupational structure of communities. The index has three education variables – the percentage of persons aged over 15 who were attending CAE or university, had left school at or below the age of 15 and had no qualifications (Australian Bureau of Statistics 1998). The index incorporates occupation in a similar manner to the Index of Relative Socio-Economic Disadvantage. Martin (1994) recommended this index to undertake area analyses, arguing that it was the best readily available area based measure of SES for studies of educational outcomes, being stable, having a good range and providing

an 'easy reference for the degree of bias in institutions' enrolments' (Martin 1994, p. xii).

The third SEIFA index tested, the Index of Economic Resources, summarises income, rent, housing characteristics and number of cars. This index does not include assets or measures of wealth such as savings, equities, debts or property values (Australian Bureau of Statistics 1998, p. 6). Occupation is not included in the index, nor are any education variables. The index was recently recommended as an appropriate SES index for the Vocational and Educational Training (VET) sector (McIntyre 2000).

The fourth index the project will employ is the SES Index for General Recurrent Grants. Although this not a SEIFA index, it is also derived from 1996 Census data. It includes variables such as occupation, education and income (DETYA 1998). The index incorporates five education variables – the percentage of persons aged over 15 who had a degree or higher qualification, left school at age 15, were not attending an educational institution, had a trade or other qualification and had no qualifications (DETYA 1998, p. 17). For this index major ASCO categories are entered as a percentage of employed persons for each sex (DETYA 1998, p. 17).

Limitations to area analyses

By far the greatest disadvantage of area based SES analyses is that of heterogeneity within spatial units. The diversity of individuals within postcodes and, in particular, discrepancies between the profiles of students and the profiles of residents in the same area are problems. As an example, some exclusive private schools with a high proportion of boarders from rural areas recently received substantial boosts to their funding because of a formula that took into account the low SES of rural areas (Senate Employment, Workplace Relations, Small Business and Education, Legislation Committee 2000, p. 32). Other discrepancies can occur in areas inhabited by a high number of retirees, where the average SES could be expected to be quite different from the SES of families with school children or independent students living in the area.

Power and Robertson (1987) compared the postcode method with individual analyses and concluded that, for measuring the SES status of individuals, there could be significant error involved in using postcodes and that aggregate postcode indexes had a relatively low association with the underlying dimension of SES status. Similarly, Ainley and Long (1995), in a review of empirical studies using area based indexes of SES, concluded that the postcode method lacked predictive power (Ainley & Long 1995, p. 14). According to Western et al. (1998, p. 16) there is a widespread scepticism of the 'postcode method' among university equity officers.

Undertaking the area analyses

In order to undertake the area analyses of students at Victoria University, the complete student database was interrogated. Student address records were geocoded[6] to several geographic levels, including Postal Area (POA) and Census Collection District (CD). After student addresses were geocoded to standard geographic areas the records were analysed against the four SES indexes

[6] Geocoding is a process of identifying the geographic location of an address using a Geographic Information System (GIS). A GIS software package assigns 'x' and 'y' co-ordinates to street addresses and the corresponding geographic areas (CD, POA) are identified.

mentioned above (see table 1).[7] The overall process created an 'active' database by successive culls: TAFE enrolments; incomplete and duplicate student records; records with addresses unable to be geocoded; and full fee overseas student records. Hence the figures below must not be confused with VU enrolment numbers overall: they are *VU domestic usable records that were able to be geocoded.*

Findings from the area analyses

Consequently we present below results for Victoria University's domestic higher education students only, using validly recorded and geocoded enrolments for both 2000 and 2001. Since there is considerable overlap between the years we analysed the enrolments in three sets: 2000 students not enrolled in 2001 (n = 3,415), all 2001 enrolments (n = 10,759) and all 2001 enrolments plus 2000 students not enrolled in 2001 (n = 14,174). Table 2 summarises and compares the relevant estimates of socio-economic status for VU higher education students.

Prima facie this *average* data suggests that the differences generated by the CD and postcode methods are small: probably too small in this case to justify the step from the relatively simpler and cheaper postcode data to the finer CD level data. If similarly small differences exist between the methods at other universities the postcode method should be adequate for comparing the SES of students across universities. Perhaps more significantly, however, the VU data confirm clearly the lower than average SES of this university's student population. Given that university entry in general is biased in favour of those from relatively higher socio-economic backgrounds this finding is all the more significant.

Table 2 VU higher education students' area based SES

Basis for analysis	*Mean* 2000 enrolments** (n=3,415)*	*Mean* 2001 enrolments (n=10,759)*	*Mean* 2000-01 enrolments (n=14,174)*
SEIFA index of relative socio-economic disadvantage			
CD method	1003.752 (104.103)	999.771 (100.419)	1000.730 (101.329)
Postcode method	1002.541 (79.764)	997.494 (79.387)	998.710 (79.505)
Melbourne metropolitan average SEIFA index of relative socio-economic disadvantage			1024.839
Victoria average SEIFA index of relative socio-economic disadvantage			1015.970
SEIFA index of education & occupation			
CD method	1011.127 (100.432)	1002.377 (99.191)	1004.485 (99.558)
Postcode method	1010.661 (88.740)	1001.436 (87.493)	1003.658 (87.881)
Melbourne metropolitan average SEIFA index of education & occupation			1028.323
Victoria average SEIFA index of education & occupation			1013.406
SEIFA index of economic resources			
CD method	1016.223 (91.125)	1017.037 (88.585)	1016.841 (89.201)
Postcode method	1015.350 (69.134)	1014.147 (67.911)	1014.437 (68.207)
Melbourne metropolitan average SEIFA index of economic resources			1033.244
Victoria average SEIFA index of economic resources			1016.718

[7] The analyses for the Index for General Recurrent Grants (ABS Composite Index) will not be discussed in this paper, but further details may be obtained from the authors.

* The figures in brackets beneath the means are standard deviations.
** Recall that 2000 enrolments here means 2000 students who did not re-enrol in 2001.

Table 3 summarises the position of VU higher education students (2000-01 enrolments) compared with the Melbourne and Victorian averages. The Melbourne metropolitan average is the most relevant against which to compare the average for VU students. This is because VU students primarily have addresses in metropolitan homes.[8] The difference in means in the SEIFA rankings highlighted by table 3 is large, especially for the average SEIFA index of relative socio-economic disadvantage. The proportion of VU higher education students that falls below the metropolitan average SEIFA index of relative socio-economic disadvantage ranking is about 55 per cent.

Table 3 VU 2000-01 HE students' SES to Melbourne & Victorian averages (difference)

SEIFA index	*CD method*		*Postcode method*	
	Melbourne	*Victoria*	*Melbourne*	*Victoria*
Index of relative socio-economic disadvantage	-24.109	-15.240	-26.129	-17.260
Index of education & occupation	-23.838	-8.921	-24.665	-9.748
Index of economic resources	-16.403	0.123	-18.807	-2.281

A more detailed set of results is presented in table 4. Here we applied a paired samples t-test to test the proposition that there were no significant differences between the means derived by the CD and postcode methods.[9] Results for all 2000 enrolments and all SEIFA index of education and occupation indicate that we can reject the proposition that the differences were significant. That is, there is no statistically significant difference between the means obtained by the CD and postcode methods: it makes no significant difference which method is used. However, 'statistically' significant differences occur for the SEIFA index of relative socio-economic disadvantage and index of economic resources for both the 2001 and combined 2000-01 enrolments. The t-statistics for these instances have been underlined in table 4.

Table 4 t-tests for VU higher education students' area based SES

Basis for analysis	*2000 enrolments***	*2001 enrolments*	*2000-01 enrolments*
SEIFA index of relative socio-economic disadvantage			
t-statistic	1.037	3.693	3.699
Significance (two-tailed)	0.300	0.001	0.001
SEIFA index of education & occupation			
t-statistic	0.517	1.927	1.925
Significance (two-tailed)	0.605	0.054	0.054
SEIFA index of economic resources			
t-statistic	0.845	5.148	4.871
Significance (two-tailed)	0.398	0.001	0.001

** Recall that 200 enrolments here means 2000 students who did not re-enrol in 2001.

[8] See the note accompanying table 5 below.
[9] SEIFA indexes are ordinal, but they (a) approximate interval data and (b) are normally distributed. A t-test, therefore, is appropriate.

Note, however, that we have placed 'statistical' in inverted commas. In practice a result may be statistically significant, but the size of its effect is low (i.e., the relationship or difference is weak and or small). This is especially so for large samples such as this. For these reasons we think that the difference between the CD and postcode methods of area based SES are not material. In practical terms this means that the postcode method is adequate, as well as being cheaper and more efficiently obtained, for analyses at an aggregated (or average) level.

Area analyses using the 'Martin method'

Table 5 presents distributions for SES according to the method used by DETYA (based on Martin 1994, see above). We have used the 2001 enrolments in this table. The Martin (DETYA) method classifies students by the postcode area method using the SEIFA index of education and occupation (EO). It has three levels: high (the top 25 per cent or quartile of SEIFA EO postcodes); medium (the two middle quartiles or 50 per cent); and low (the lowest quartile or 25 per cent).

The Martin (DETYA) method also presents three separate ways of measuring the quartiles: Australia wide, state wide and urban. These reflect different SES patterns across the country and between city and rural and regional areas. Urban areas have a higher SES than state wide or Australian measures (cf. Melbourne and state averages in table 2). As only about 3.5 per cent of domestic VU higher education students have addresses in non-urban backgrounds we have used the DETYA (Martin) urban measurements, just as we used the Melbourne average SEIFA index levels for comparison above (see tables 2 & 3).

Table 5 SES according to Martin/ DETYA (area postcode method)

Level of SES	*Melbourne/urban postcode (SEIFA EO)*	*VU population valid (urban)* (SEIFA EO)*	*Difference (VU – Melbourne)*
High	70 26.7%	1,817 17.5%	-9.2% high
Medium	133 50.8%	5,202 50.0%	-0.8% medium
Low	59 22.5%	3,379 32.5%	+10.0% low
Totals	262 100.0%	10,398 100.0%	

* Note that the difference between n = 10,759 above and n = 10,398 in this table is the 3.5 per cent of non-urban students.

This table may be interpreted to say simply that, compared with the Martin indicators for urban Melbourne postcodes, 10 per cent fewer VU domestic higher education students have addresses in areas ranked high or medium SES according to SEIFA EO. Correspondingly 10 per cent more have addresses in areas ranked low SES by this index.

Individual analyses

Area based measures, however accurate they may be in aggregate, are not appropriate for assessing the SES of individual students. Were accurate data from individual students available they would clearly be preferable, both to assess individuals' SES and for aggregation. Large scale analyses using individual data commonly survey a population or sample of individuals or structured samples

representative of certain groups. However, it is contentious whether this is possible or desirable in this case. In practice university equity units typically use a combination of tailored approaches to determine eligibility for services (e.g. hardship loans).

Western et al. recommended that a measure of students' SES should be based upon 'the characteristics of the individual or their household, not the characteristics of the area in which they live' (Western et al. 1998, pp. xii, 19). They proposed four fixed-choice questions be included in university enrolment forms to collect information on the mother's and father's occupation and educational level at the time the student was attending secondary school (Western et al. 1998, p. xii). Occupations would be coded according to the ANU3 scale, an ASCO derived scale that ranks occupational prestige (1998, p. 37). Parental education levels would be analysed by scaling the highest level of education completed and the standard of qualifications obtained. Watson et al. (2001, p. 32) suggested extending use of the 'Western method' to all education sectors, arguing this would lead to an improvement in both the quality and comparability of data on students' SES.

Limitations to individual analyses

Linke has described surveys necessary to develop individual indexes as 'costly and inconclusive' (1983, p. 125). He regarded the most 'efficient' approach to be 'regional association, or the tendency of people to live in areas of comparable housing quality and hence among others of broadly similar occupational, educational and income status' (Linke 1983, p. 125). Martin (1994) also said that individual approaches were too costly to be appropriate for assessing national student progress. She argued that measures of parental income, Austudy eligibility and type of school attended were all unsatisfactory proxies for SES (Martin 1994, p. xviii). Ainley and Long argued that collecting data from students about their families can be intrusive, particularly for those from 'non-traditional family structures' (1995, p. 53). This issue is especially salient for Victoria University, Australia's most culturally diverse university.

A specific concern about the 'Western method' is that, while there is universal agreement that educational background should be an important component of SES indicators, few studies account for changes to education demographics over the past two decades. Most significant is that the increasing educational level of the population also increases the possibility that education and SES may not closely correlate (Skuja 1995). Another problem is that Australian higher education studies (e.g. those using ANU3) do not adjust occupational categories for recent labour market changes, particularly in relation to increased casualisation, part time or part year work. This can affect reliability, especially when attachment to the labour force is affected by family responsibilities, study or labour market adjustments.

Moreover scaling is relatively straightforward for students with Australian-educated parents. For NESB students, however, whose parents' qualifications may fall outside the frameworks commonly used or recognised in Australia, the task is more difficult (MCEETYA 1989, 1999). Also account has not been taken of difficulties that may arise for NESB students whose parents may face discrimination in the labour market and the skills recognition processes. These are important problems for VU students.

Undertaking the individual analyses

The individual analyses component of the *Equity indicators project* at Victoria University was conducted as part of a single page survey attached to re-enrolment forms. The survey was administered to students who re-enrolled in December 2000. Approximately 1,000 domestic higher education students, or about 10 per cent of total domestic enrolments for 2001, returned the survey. The survey questions were based on those recommended by Western (parental occupation and education). However, they also included some additional measures of community disadvantage. Parental education and occupation were scaled as described in table 6. Student postcodes were matched to the survey returns. This permits corresponding area SES data to be compared.

Table 6 Scoring of educational qualifications and occupations

Score	*Educational qualification*	*Occupation*
1	No formal schooling / primary only	Not in paid work, unemployed
2	Some secondary school	Factory hands, other labourers
3	Completed secondary school	Drivers, heavy plant operators, elementary services workers
4	Apprenticeship trade certificate	Other trades, clerks, assistants
5	Diploma / associate diploma	Sales assistants, mechanical engineering and metal trades, printing trades, food trades
6	Partial degree course	Other office/clerical workers, specialist plant operators
7	Other special training	Advanced clerical workers, inspectors/assessors and miscellaneous trades
8	Bachelor degree	Sales and service providers and support workers
9	Postgraduate degree / grad diploma	Farmers, general managers, associate professionals and artists
10	Do not know	Professionals group two*
11		Professionals group one*
12		Senior executive/manager in large business or government department/agency

* More detailed specification was provided to students, but it is not necessary to repeat it here

Representativeness of the sample

The students sampled were roughly representative of the university's population of domestic higher education students across key indicators.[10] One relevant issue in this respect was whether the aggregate area based SES of the sample was representative of the aggregate area based SES of the university's population. Table 7 demonstrates that both VU populations ('urban' valid and 'all' valid) and the sample data have very close averages SEIFA indexes of relative socio-economic disadvantage and education and occupation in all but one instance. The sample survey SEIFA EO value of 996.238 differs noticeably from the population averages, which are both more than 1002. This suggests that here might be grounds for additional enquiry into whether subtle sample biases are at work.

[10] A more detailed assessment of the sample (e.g. by faculty, level of study, etc.) is possible, but here our focus is on university wide results.

Table 7 VU 2001 domestic higher education students' area based SES: population and sample

	SEIFA index of relative socio-economic disadvantage (DIS)	*SEIFA index of education & occupation (EO)*
Mean all valid 2001 enrolments using CD method (n = 10,759)	999.771	1002.377
Mean all valid 2001 enrolments using postcode method (n = 10,759)	997.494	1001.436
Mean urban valid 2001 enrolments using CD method (n = 10,398)	998.914	1002.132
Mean urban valid 2001 enrolments using postcode method (n = 10,398)	996.534	1001.323
Sample survey 2001 using CD method (n = 1,017)	999.519	999.341
Sample survey 2001 using postcode method (n = 1,017)	995.211	996.238

Table 8 looks at the issue of representativeness using the Martin indicators. The SEIFA index of education and occupation and the urban data are relevant in this comparison. This table demonstrates that both the VU domestic higher education urban population and sample data have higher incidences of low SES according to the Martin indicators than does the urban population (i.e. the average SEIFA EO for Melbourne by postcode). There are also small differences between the results for respondents to the survey and the VU urban population. According to the survey 11.8 per cent fewer VU domestic higher education students have addresses in areas ranked high or medium SES according to SEIFA EO. Correspondingly 11.8 per cent more have addresses in areas ranked low SES by this index. These figures contrast with 10 per cent for the population overall (see table 5). This difference reinforces the comment about table 7 that some subtle sample biases may be at work.

Table 8 SES according to Martin/ DETYA (area postcode method)

Level of SES	*Melbourne/urban postcode average (SEIFA EO)*	*VU population valid (urban)* (SEIFA EO)*	*VU sample survey valid (SEIFA EO)*
High	70 26.7%	2,478 17.5%	256 15.9%
Medium	133 50.8%	6,882 50.0%	743 49.8%
Low	59 22.5%	4,318 32.5%	492 34.3%
Totals	262 100.0%	13,678 100.0%	1,017 100.0%

Analysis of individual factors

To discuss the utility of the individual factors that DETYA have recommended based on Western (1998), and upon which we surveyed students, we offer below what is in effect a two step procedure. First we present percentiles describing the responses to the survey questions. These are in four categories or factors: mother's highest educational level, father's highest education level, mother's usual occupation during the student's time at secondary school and father's usual occupation during the student's time at secondary school. Second we attempt to

see whether these individual responses correspond with the area based classifications.

For students in our sample the distributions across each percentile vary markedly for each individual factor (i.e. the four categories noted above). The results are presented in tables 8 (educational attainment) and 9 (occupation). Parental educational attainment is skewed towards the lower end of the distribution, which is to say that most parents of the respondents had completed secondary school only (60.2 per cent for mothers and 48.4 for fathers). Occupational status, on the other hand, is distributed relatively evenly. Although Western et al. (1998) recommend that both educational level and occupational status be used as separate dimensions to measure SES, these results suggest that the separate dimension of educational level may be less useful. Occupation is clearly linked more closely to other indicators such as family income.

Table 8 Parental educational attainment: VU survey responses

Educational qualification	*Mother's (valid %)*	*Father's (valid %)*
No formal schooling / primary only	10.4	10.5
Some secondary school	28.3	23.9
Completed secondary school	23.6	17.4
Apprenticeship trade certificate	4.5	12.1
Diploma / associate diploma	7.5	5.3
Partial degree course	2.1	2.0
Other special training	1.8	2.0
Bachelor degree	8.8	11.1
Postgraduate degree / grad diploma	4.5	5.7
Do not know	8.4	10.1
Total	*100.0*	*100.0*

Table 9 Parental occupation: VU survey responses

Occupation	*Mother's (valid %)*	*Father's (valid %)*
Not in paid work, unemployed	18.1	4.0
Factory hands, other labourers	13.2	12.2
Drivers, heavy plant operators, elementary services workers	1.1	8.7
Other trades, clerks, assistants	5.1	12.0
Sales assistants, mechanical engineering and metal trades, printing trades, food trades	5.6	4.8
Other office/clerical workers, specialist plant operators	7.4	2.4
Advanced clerical workers, inspectors/assessors and miscellaneous trades	11.4	5.0
Sales and service providers and support workers	9.6	8.9
Farmers, general managers, associate professionals and artists	5.3	8.1
Professionals group two*	11.1	11.5
Professionals group one*	10.1	12.9
Senior executive/manager in large business or government department/agency	2.0	9.5
Total	*100.0*	*100.0*

Survey responses regarding parental educational attainment and occupation, ranked 1-9 and 1-12 as per table 6, also may be related to the corresponding area

SES levels for each student. There are a number of ways to do this, but it is important first to be clear why we might undertake the task. Let us present an hypothesis: 'to obtain SES rankings at the aggregate level it does not much matter whether we use an aggregated (average) area based postcode measure or aggregated (average) individual Western-DETYA survey data because the results will broadly correspond'. Conceptually the tests involved are therefore of the same order as those above that compared area CD and area postcode aggregates. The practical difference is that the Western-DETYA data are ranked categorical data in four categories, so the earlier approach of comparing means was out of the question.

We are not interested *for the purposes of this hypothesis* in how Western-DETYA rankings in individual cases may not correspond well the area postcode SEIFA rankings and by how much. We know a priori that associational statistics (e.g. regression r-squares) relating survey responses for the four categories and the corresponding postcode SEIFAs will be poor. This is because they will estimate the proportion of variance in the set of *individual* scores based on SEIFA areal (postcode) coding accounted for by the four Western-DETYA categories. Similarly the fit between the CD and postcode SEIFAs was relatively poor. This merely says what we have said above, and what common sense would dictate, which is that the SES of individuals cannot be measured by the SES average of the areas in which they maintain an address, even when those areas are as small as ABS collection districts. Area SES measures are useless for equity officers in dealing with individual students.

However, area measures are useful at the institutional level. They can tell us about an institution's catchment area and its student population taken as a whole or on average. The interesting question posed in our hypothesis then is this: how closely, at the institutional level, will aggregate area SES measures fit with (relate to) aggregates derived from surveys of individuals? Another way of asking it is this: can we reasonably map SES rankings derived from Western-DETYA levels to average SEIFA data and vice versa? Our survey data were designed to help us to answer these questions.

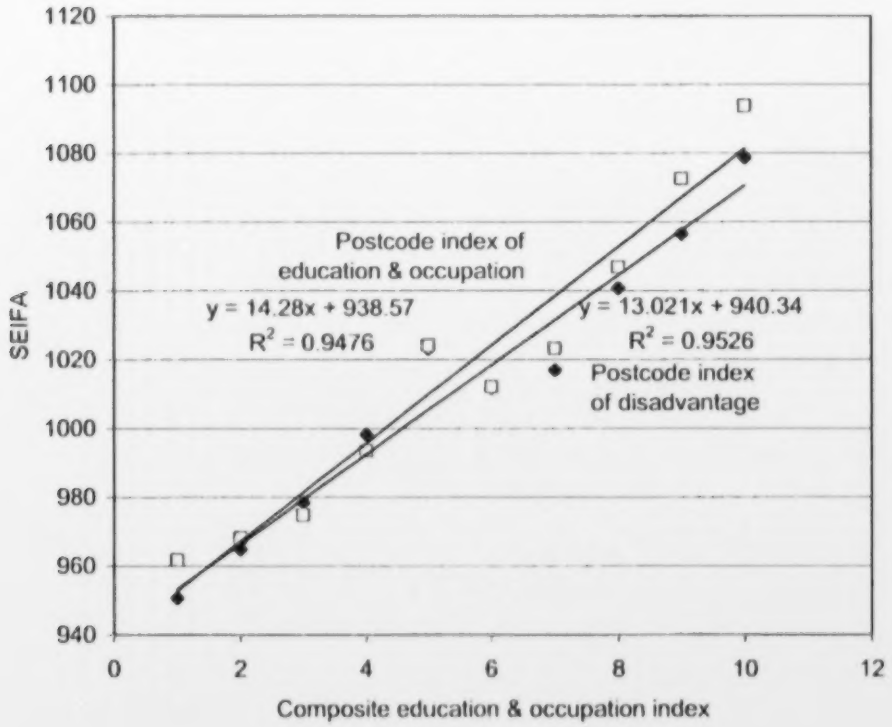
Hence we approached the answer in two steps. First we reweighted the nine point education and 12 point occupation scales so that, in creating a composite index, neither education or occupation would have more weight. Missing cases were eliminated from the sample for the same reason. A composite index based on the survey data was then created by averaging across the four education and occupation categories, and a 10 point scale for the composite index was created for convenience. Then we calculated the mean of the postcode SEIFA index of socio-economic disadvantage and index of education and occupation entries corresponding to the new 10 point composite index. The results, which demonstrate clearly a close mapping relationship between average postcode area SES and the survey results, are presented in table 10 and chart 1.[11] The only caveat we would place on this is that, by eliminating missing cases, the sample size was reduced (n = 551).

Table 10 Western-DETYA composite index & corresponding postcode SES means

[11] A similarly close result for the CD area SES and the survey results was also found. We have not reproduced this here as they do not add anything substantive to the analysis.

Composite survey index of reweighted averaged responses to parents' education and occupation categories	*Postcode level SEIFA index of relative socio-economic disadvantage*	*Postcode level SEIFA index of education and occupation*
1	950.676	961.715
2	964.825	968.272
3	978.390	974.721
4	998.267	993.480
5	1023.100	1024.257
6	1011.683	1012.208
7	1016.950	1023.226
8	1040.632	1046.904
9	1056.401	1072.533
10	1078.639	1093.737

Chart 1 Western-DETYA composite index & corresponding postcode SES means (with trends & statistics)



As the chart shows the r-square values are very high at this high level of aggregation (0.95 in both instances). In other words only 5 per cent of the variation is unexplained by the aggregate survey-area postcode 'fit'. We think this is sufficient to say it does not much matter whether we use an aggregated (average) area based postcode measure or aggregated (average) individual Western-DETYA survey data because the results will broadly correspond. That is, the hypothesis with which we began has not been disproved. Unless different results emerge at other universities the results here can be taken as a reasonable

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guide. We are most definitely not saying, however, that area based aggregates or averages should be used for anything other than institutional level analyses and comparisons.

Future options and holistic approaches

Although the debate on how best to measure students' SES tends pragmatically to focus on area and individual analyses there are a range of other interesting approaches. Broader SES studies have incorporated more diverse characteristics: ethnicity, marital status, family structure, language skills and residential mobility (Graetz 1995, p. 35). Measures such as the Jarman Underprivileged Area Score (UPA) and Townsend Material Deprivation Score in the United Kingdom consider issues such as overcrowding, ethnicity, home ownership, single parents in households and access to social resources (e.g. transport). Other measures use perception based approaches in which individuals are asked to describe their access to particular material commodities, such as electrical appliances and cars, relative to others in their communities (e.g. the Breadline Britain Score).

In addition, the World Bank's *Social Capital Qualitative Survey* (Lindert 1999) or Swinburne University's project, *Social Benchmarks and Indicators for Victoria* have developed a set of interrelated social indicators and benchmarks that include qualitative measures of well being in addition to quantitative measures (Salvaris et al. 2000). Methodologies that take into account factors such as social capital and subjective well being have the capacity to enrich the measurement of disadvantage, enabling stereotyped perceptions of locality and occupation to be transcended.[12]

Conclusions

A number of findings have emerged from the analysis reported in this paper. The most important of these will be summarised briefly here. First, while the debate for practical reasons tends to focus on area versus individual measures, SES is a richer and more complex subject. This must be acknowledged. Second it is apparent that Victoria University's student catchment is on average of lower SES than the Melbourne average, using various area measures of SES, including the DETYA-Martin indicators. It is therefore reasonable to infer, especially in so far as it has a high proportion of students from the western region, that the university's students are of lower SES background than those of other universities. This is because of the relatively low SES of the western region of Melbourne.

In addition this paper explored and compared area and individual survey methods. Based on the data at out disposal we drew two further conclusions. Third there is only a very small difference between average area SES measures at the collection district and the postcode level. In practical terms this means that the postcode method is adequate, as well as being cheaper and more efficiently obtained, for analyses at an aggregated (or average) level. Fourth we found that individual surveys of students suggested in the Western-DETYA approach, apart from other problems noted, do not prima facie add to the quality of aggregated institution level SES results delivered by area analyses. In other words this again means that the postcode method is best for practical reasons.

[12] See also Sen (e.g. 1992) and OECD (2001).

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